



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,374	06/22/2001	Everett Arthur Corl JR.	RAL920010014US1	7425

25299 7590 09/09/2004

IBM CORPORATION
PO BOX 12195
DEPT 9CCA, BLDG 002
RESEARCH TRIANGLE PARK, NC 27709

EXAMINER

CHANKONG, DOHM

ART UNIT	PAPER NUMBER
----------	--------------

2152

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/887,374	Applicant(s) CORL ET AL.	
	Examiner Dohm Chankong	Art Unit 2152	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- 1> Claims 1-27 are presented for examination.

Claim Rejections - 35 USC § 112

- 2> The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 3> Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The following claim contains claim language that is unclear and not clearly understood:

- i. Claim 18 - line 10 - "the plurality of processors" - this term is rendered indefinite since the claim calls for only "at least one network processor;" therefore if the network has only one network processor, there is not a plurality, leading to a case of lack of proper antecedent basis.

Claim Rejections - 35 USC § 102

- 4> The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by

Art Unit: 2152

another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5> Claims 1 are rejected under 35 U.S.C. 102(e) as being anticipated by Krishnan et al, U.S. Patent No. 6,606,710 ["Krishnan"].

6> As to claim 1, Krishnan discloses a method for determining whether to enforce a plurality of filter rules for a packet including a key in a computer network, each of the plurality of filter rules having a priority [column 5 <lines 37-41>], the method comprising the steps of:

accumulating statistics for each of the plurality of filter rules, the statistics indicating a frequency of enforcement for each of the plurality of filter rules [column 2 <lines 38-43>];
and

placing the plurality of filter rules in an order for testing against the key, the order being based on the frequency of each filter rule of the plurality of filter rules [column 2 <lines 38-61> | column 4 <lines 41-61>].

7> As to claim 2, Krishnan discloses the method of claim 1 wherein the order is from a higher priority filter rule of the plurality of filter rules to a lower priority filter rule of the plurality of filter rules [column 5 <lines 37-41>].

8> As to claim 3, Krishnan discloses the method of claim 1 wherein the ordering step further includes the step of:

providing a decision tree for testing the plurality of filter rules, the decision tree being configured based on the frequency of each of the plurality of filter rules and so that the plurality of filter rules can be tested in the order, a first portion of the plurality of filter rules having at least one higher priority being placed higher in the tree [column 4 <lines 41-50> | column 5 <lines 24-26>] where: while Krishnan does not specifically mention "decision tree" in his disclosure, he does utilize the same functionality of a decision tree, where the rules are ordered and then applied sequentially to an incoming packet. If the first rule fails, then the next rule is applied, and so on].

9> As to claim 4, Krishnan discloses the method of claim 3 wherein the decision tree providing step further includes the step of:

rebuilding the decision tree after the expiration of an interval of time [column 7 <lines 32-33>] where: Krishnan's reordering of his rule set is equivalent in functionality to the claimed step of rebuilding the tree].

Art Unit: 2152

10> As to claim 5, Krishnan discloses the method of claim 4 wherein the interval of time is determined based on a determination of how frequently a second portion of the plurality of filter rules is enforced [column 7 <lines 32-44>].

11> As to claim 7, Krishnan discloses the method of claim 4 wherein the interval of time is determined based on a previous interval of time [column 7 <lines 18-21 and 32-33>].

12> As to claim 8, Krishnan discloses the method of claim 4 wherein the computer network further includes a network processor [Figure 2] and wherein the rebuilding step further includes the step of:

placing the plurality of filter rules in the decision tree based on the priority of each of the plurality of filter rules and at least one performance factor of the network processor [column 2 <lines 46-48> | column 3 <lines 12-16> | column 4 <lines 41-50> | column 5 <lines 24-26>] .

13> As to claim 9, Krishnan discloses a system for determining whether to enforce a plurality of filter rules for a packet including a key in a computer network, each of the plurality of filter rules having a priority, the system comprising:

at least one network processor for accumulating statistics for each of the plurality of filter rules, the statistics indicating a frequency of enforcement for each of the plurality of filter rules and testing a portion of the plurality of filter rules against the key in an order, the

Art Unit: 2152

order being based on the frequency of each filter rule of the portion of the plurality of filter rules [Figure 2 | [column 2 <lines 38-61> | column 4 <lines 41-61>]; and

at least one memory for storing the plurality of filter rules [Figure 2].

14> As to claims 10-13 and 15-16, as they are claims to a system that performs the steps of the method of claims 2-5 and 7-8, they do not teach or further define over the limitations recited in claims 2-5 and 7-8. Therefore, claims 10-13 and 15-16 are also rejected for the same reasons as set forth in claims 2-5 and 7-8, supra.

15> As to claims 19-23 and 25-26, as they are claims to a computer readable medium that performs the steps of the method of claims 1-5 and 7-8, they do not teach or further define over the limitations recited in claims 1-5 and 7-8. Therefore, claims 19-23 and 25-26 are also rejected for the same reasons as set forth in claims 1-5 and 7-8, supra.

16> As to claim 27, Krishnan discloses a method for determining whether to enforce a plurality of filter rules for a packet including a key in a computer network, each of the plurality of filter rules having a priority [column 5 <lines 37-41>], the method comprising the steps of:

accumulating statistics for each of the plurality of filter rules, the statistics indicating a frequency of enforcement for each of the plurality of filter rules [column 2 <lines 38-43>];
and

testing a portion of the plurality of filter rules against the key in an order, the order being based on the frequency of each filter rule of the plurality of filter rules [column 2 <lines 38-61> | column 4 <lines 41-61> where: Krishnan discloses 'sequentially applying' the rules to the key of the packet which is equivalent in functionality to testing the filter rules in an order].

Claim Rejections - 35 USC § 103

17> The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18> Claims 6, 14 and 24 are rejected under 35 U.S.C 103(a) as being unpatentable over Krishnan in view of an Official Notice.

19> Krishnan does disclose the rebuilding the tree after an interval of time and that this interval of time can be based by certain operating parameters of the firewall, and specifically that rules with higher counts are swapped with rules with lower counts. So while Krishnan suggests that the interval between rebuilding would be diminished if lower count rules were located higher in the tree than higher count rules, he does not specifically disclose that the interval of time decreases when the first portion of the plurality of filter rules are accessed less frequently than a third portion of the plurality of filter rules.

Art Unit: 2152

20> However, Official Notice is taken that it is well known and expected in the art to implement the technique of decreasing the intervals between reordering of filter rules so that higher count rules can be placed first in the tree to increase the performance and efficiency of the packet filter.

21> Claim 14 is a system that performs the step of the method of claim 6. Therefore, claim 14 is rejected for the same reasons as set forth in claim 6, supra.

22> Claim 24 is a computer readable medium that performs the step of the method of claim 6. Therefore, claim 14 is rejected for the same reasons as set forth in claim 6, supra.

23> Claim 17 is rejected under 35 U.S.C 103(a) as being unpatentable over Krishnan in view of Zenchelsky et al, U.S Patent No. 6,173,364 ["Zenchelsky"].

24> Krishnan does not disclose the use of at least one memory including a fast memory and wherein a first portion of the plurality of filter rules are placed in the fast memory, each of the first portion of the plurality of filter rules having a higher priority.

25> Zenchelsky teaches the use of a cache wherein a portion of plurality of filter rules are placed in the cache, each of the portion of filter rules having a higher priority [column 4 <lines 39-44> | column 5 <lines 1-3>] where: it is well known in the art that a cache is equivalent

Art Unit: 2152

to a fast memory]. Zenchelsky's caching of higher use/priority rules enables quicker, more efficient searching of filter rules to match with incoming packets. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement Zenchelsky's caching technique into Krishnan's memory system for the obtained advantages of saving processor time and improving filter throughput [column 6 <lines 5-8>].

26> Claim 18 is rejected under 35 U.S.C 103(a) as being unpatentable over Krishnan, in view of Lakshman et al, U.S Patent No. 5,951,651 ["Lakshman"].

27> Krishnan discloses switch for use in a computer network, the switch determining whether to enforce a plurality of filter rules for a packet including a key, each of the plurality of filter rules having a priority [Figure 2 | column 5 <lines 37-41>], the switch comprising:

at least one network processor for accumulating statistics for each of the plurality of filter rules, the statistics indicating a frequency of enforcement for each of the plurality of filter rules and testing a portion of the plurality of filter rules against the key in an order, the order being based on the frequency of each filter rule of the portion of the plurality of filter rules [Figure 2 | [column 2 <lines 38-61> | column 4 <lines 41-61>];

at least one memory for storing the plurality of filter rules [Figure 2].

Krishnan does not disclose a switch fabric coupling a plurality of processors.

28> Lakshman discloses a switch fabric coupling the plurality of processors [Figure 8a <items 205,250(a...n)> | column 6 <lines 2-10>]. Lakshman's switch fabric provides the use of a

Art Unit: 2152

plurality of network processors to concurrently process incoming packets to apply filter rules, increasing the packet throughput through the switch. Therefore, it would have been obvious to one of ordinary skill in the art to implement multiple processors as detailed by Lakshman into Krashnin's switch to provide the aforementioned benefit of increased packet throughput through the network.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S Patent No. 5,463,777 to Bialkowski et al [Use of binary trees to filter packets for forwarding - abstract, Figure 3];

U.S Patent No. 5,761,424 to Adams et al [Automatic filtration of packets passing through an apparatus with the use of a filtration table and rules - abstract];

U.S Patent No. 6,341,130 to Lakshman et al [Router with prioritizing packet filter rules and the use of a search tree to quickly process packet rules - abstract, Figure 9a];

U.S Patent No. 6,772,346 to Xie et al [Firewall with filter rules and counter means to keep track of number of times a rule has been used].

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dohm Chankong whose telephone number is (703)305-8864.

The examiner can normally be reached on 8:00AM - 5:00PM.

Application/Control Number: 09/887,374

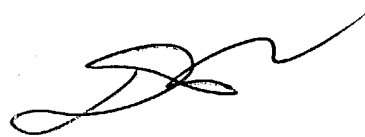
Page 11

Art Unit: 2152

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (703)305-8498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DC



Dung C. Dinh
Primary Examiner